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⑯ Bipod for a gun and a gun embodying same.

⑯ A bipod for a gun has a pair of legs (800) connected to a mounting assembly (803) and the mounting assembly includes a part spherical ball (815) for connection within an aperture in the underside of the gun and a rearwardly facing mouth (819) for cooperating with a lug on the gun. The lug (815) and mouth (819) are axially displaced from one another and arranged so as to permit the gun to roll and sweep in X and Y planes.

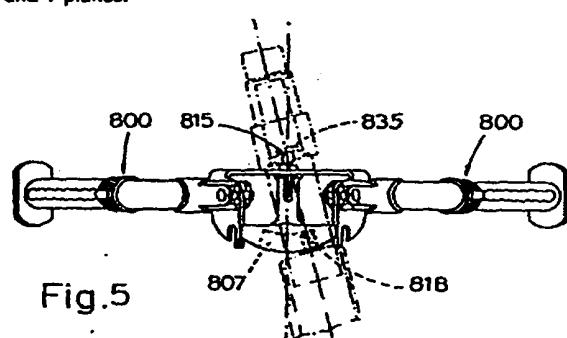


Fig. 5

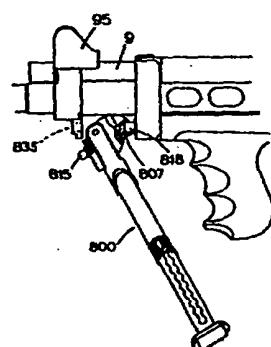


Fig. 6

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BIPOD FOR A GUN AND A GUN EMBODYING SAME

This invention relates to a bipod for a gun and a gun embodying same. Although this invention is particularly applicable to guns known as assault rifles, it is to be understood that it is not limited thereto.

5 With guns of the assault rifle type it is known to provide a bipod attached to a lug underneath the gun barrel with the legs of the bipod being extendable. However, known bipods usually only permit the gun barrel to roll in a Y-plane, which is perpendicular to an X-plane longitudinally extending along the barrel length and perpendicular to the 10 barrel length, although the present applicants believe that some bipods have been produced using a universal joint comprising two C-shaped members perpendicularly arranged to one another which are interlinked through the intermediary of a cruciform-shaped member. It will be realised that the production of a universal joint coupling for a bipod 15 is complex and, therefore, costly and, furthermore, the connection of the bipod to the gun is also complex.

This invention seeks to provide a bipod for a gun and a gun embodying the bipod in which the aforementioned disadvantages are, at least, partially mitigated.

20 According to this invention there is provided in one aspect a bipod for a gun including a pair of legs connected to a mounting means, the mounting means comprising a forwardly facing part spherical ball for connection within an aperture in the underside of the gun and a rearwardly facing mouth for cooperating with a lug, also on the underside of 25 the gun, which is axially displaced from the aperture, the arrangement of the ball and mouth being such as to permit the gun to sweep and roll in X and Y planes respectively as hereinbefore defined.

According to a further aspect there is provided a gun including a bipod having a pair of legs connected to a mounting means comprising a 30 forwardly facing part spherical ball arranged to engage with an aperture in the underside of the gun and a rearwardly facing mouth arranged to cooperate with a lug on the underside of the gun, the lug being axially displaced from the aperture, whereby the ball and mouth are arranged so as to permit the gun to sweep and roll in X and Y planes respectively as 35 hereinbefore defined.

Preferably, the part spherical ball is spring biassed forwardly towards the gun aperture to facilitate attachment/detachment from the gun.

Advantageously, the legs are both pivotally connected to the mounting means and arranged to adopt at least two predeterminedly fixed positions. In a preferred embodiment, each leg is supported from an axle secured to the mounting means and disposed along the 5 leg axis is a pin arranged to cooperate in turn with one of two perpendicularly displaced open-ended slots in the mounting means, the leg being spring biassed toward said slots.

In the preferred embodiment each leg is spring biassed toward said slots by the arrangement of a hanger circumferentially encircling 10 the leg having one end mounted on the axle and its other, remote end connected to a pin passing through an axial slot in the leg, and a compression spring between the pin and a closure of the leg positioned toward the axle, whereby the spring is compressed to withdraw the pin from a respective one of the slots.

15 The mounting means preferably comprise a yoke-shaped sub-frame having two wings upwardly extending from the mouth and a forwardly extending tube within which is mounted the part spherical ball, and a U-shaped bracket having limbs extending from the front of the tube to a respective one of the wings.

20 Advantageously, each of the legs comprise at least two telescopically arranged tubes having a latch therebetween for predeterminedly selecting a desired extension between the tubes.

The terms "forward" and "rearward" and similar adverbially phrases used herein are used in relation to the gun muzzle so that, for 25 example, the buttstock is positioned rearwardly of the muzzle.

The invention will now be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a left hand side view of a gas operated fully automatic gun in accordance with this invention, drawn to a reduced 30 scale in comparison with the remaining figures;

Figure 2A shows a rear side view of a bipod in accordance with this invention;

Figure 2B shows a cross-section of the bipod along double arrow-headed lines B-B of Figure 2A;

35 Figure 2C shows a cross-section along double arrow-headed lines C-C of Figure 2B;

Figure 2D shows a cross-section along double arrow-headed lines D-D of Figure 2C;

Figure 2E shows a cross-section along double arrow headed lines E-E of Figure 2A;

5 Figure 3 shows a top plan view of the bipod shown in Figure 2A and, in phantom lines, with the legs raised;

Figure 4 shows the bipod of the invention connected to a gun depicting the gun rolling in a Y-plane;

10 Figure 5 shows the bipod of the invention connected to a gun depicting the gun sweeping in an X-plane; and

Figure 6 shows the bipod in partial section being attached/detached to a gun.

In the Figures like reference numerals denote like parts.

The gas operated automatic gun shown in Figure 1 has a receiver 15 1 to the rear wall channel 131 of which is connected a buttstock 2 and at the opposite end of the receiver 1 from the buttstock 2 there is connected a barrel 10. A pistol grip 11 is connected by a screw and nut underneath the receiver 1 and a fore grip 12 is connected by screws on the underside of the barrel 10. The pistol grip 11 is 20 connected to the receiver 1 through the intermediary of a trigger guard 72 shrouding a trigger assembly 73 having a rotatable sear actuator (safety catch) 77.

25 Mounted in the bottom well of the receiver 1 is a cartridge magazine 4 which is of the drum type although it may be a flat box-type magazine. The magazine 4 is held to the receiver by a magazine latch assembly 5.

A cocking handle assembly 6 is mounted on the left hand side of the receiver 1 incorporating a cocking bar sub-assembly 60 including a cocking handle 601.

30 Mounted on the top rear of the receiver 1 is a rear sight mount 96 and on the right hand side of the receiver is a carrying handle 97. Also on the right hand side of the receiver is an ejector slot 104 and in both sides at the front of the receiver are provided four cooling apertures 105 to assist in removing heat from the rear 35 end of the barrel 10. A gas system 9 is connected in between the front of the receiver 1 and a foresight assembly 95. A bayonet lug attachment 98 is provided on the barrel and at the muzzle there is a flash suppressor 99.

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The bipod shown in Figures 2A and 3 has a pair of telescoped tubular legs 800, each having an outer leg 801 and an inner leg 802. The top of the outer leg 801 is pivotally connected to a mounting assembly 803 and the lower end of each of the inner legs is 5 connected to a foot 804 by a split pin 805.

The mounting assembly 803 is formed by a yoke-shaped sub-frame 806 having upwardly extending wings, an elongate slotted mouth 807 and a forwardly extending tube 808 which has an axially extending slot 809 in the outer periphery thereof. Connected to the sub-frame 10 806 and forming the other part of the mounting assembly 803 is a generally U-shaped bracket 810 having side limbs which have a major downwardly sloping surface that provides the bipod with its apex angle. Each side limb 811 is connected to a respective wing of the yoke-shaped sub-frame 806 by welding and the lower rearwardly 15 facing portion of each side limbs 811 is arcuately contoured. Additionally, each limb is provided with a rearwardly facing slot 812 and a downwardly extending slot 813, the slots 812 and 813 being provided for predeterminedly securing the legs 800 in either a downward position for contacting the ground or in a raised position in 20 which the legs extend rearwardly alongside the gun receiver.

Referring to Figure 2E, mounted in the tube 808 and extending forwardly through the bracket 810 is a plunger 814 on which is machined, at its outer extremity, a part spherical ball 815 which forms one part of a ball joint. The plunger 814 is biassed 25 by a compression spring 836 and captured within the tube 808 by a cross-pin 816. The spring 836 is retained within the tube 808 by an interior wall in which is disposed an axial hole 817 having a diameter sufficient to permit the plunger stem to pass therethrough to abut a circularly cross-sectioned gun mounting lug 818 (shown in 30 Figure 5) which is inserted, in operation, into a port 819 of the tube 808. The purpose for the abutting relationship is to reduce the possibility of the bipod being accidentally detached from the gun.

Referring now to Figure 2B, inserted into the top of the 35 outer leg 801 and shaped to fit inside the leg 801 is a rod 820 having its upper portion cut in an axial direction with a cruciform

shape (not shown in detail). One part of the cruciform, shown in Figure 2A and Figure 3, is for permitting traverse of the arcuate portion of the bracket 810 and the other part of the cruciform is provided to permit the leg to be inserted over an axle 821. The axle 5 821 has a circular cross-section and two pairs of flat surfaces which are axially spaced with flat surfaces of each pair being diametrically opposed and the flat surfaces of the axle 821 cooperate with the said other part of the cruciform in the rod 820. Inserted into a hole in the rod 820 is a stop pin 822 which cooperates with the slots 812 10 and 813 of the bracket. Also suspended from the axle 821 is a hanger 823 having relieved upper portions 824 to enable hanger to rotate around the arcuate portion of the bracket 810 and relieved lower portions to provide clearance between the hanger and the gun receiver when the legs are raised. Inserted through the combination 15 of hanger 823 and rod 820 is a take-down pin 825 having a central reduced portion to accommodate a compression spring which is located thereby and biased therebetween and the top of an axial closed bore in the rod 820. A slot 827 passing diametrically through the rod 820 permits the leg to be axially movable so that the stop 20 pin 822 may be removed from the slot 813 and the leg rotated around the arcuate surface of the bracket to the slot 812 with the bias of the spring 826 effectively pushing on the hanger 823 through the pin 825 causing the stop pin 822 to be pushed away from the take-down pin 825 and, therefore, into the slots 812 or 813.

25 In the outer wall of each of the lower inner legs 802 is formed a series of axially extending holes 828 linked together by slots 829 to form a continuous slot with a series of local expansions, as shown in figures 3, 5 and 6. Circumferentially surrounding the lower end of the outer leg is a collar 830. Referring now particularly 30 to Figures 2B and 2C and 2D, secured in an inner wall portion of the inner leg 802 is a pin 831 which is spring biased against a latch button 832 by a compression spring 833, the spring being secured over a portion of the pin 831 and inside a bore of the latch button 832. The latch button 832 is circular in cross- 35 section but has two diametrically opposed flat surfaces 834 which protrude through an aperture in the collar and in this manner, by virtue of the spring 833 and pin 831, the button is biased outwardly against the interior wall of the collar 830. The distance

between the flat surfaces 834 of the button is arranged so that the button is able to slide in the slot 829 of the inner leg and the full diameter of the button 832 is such that it is able to engage the local hole expansions 828, and by virtue of the force of the spring

- 5 833 so the button is pushed outwardly to lock the inner leg to one of the expanded hole portions in the outer leg. The collar has the added function of circumferentially surrounding the outer leg and since the outer leg is weakened by the provision of the linked holes so the collar provides a support for the lower portion of the outer
- 10 leg to prevent the outer leg from splitting.

Referring now to Figure 6, the bipod is shown partially mounted onto the lug 818 and to enable the mouth of the bipod to be inserted over the lug 818, the lug is undercut at its lower root portion and chamfered at its top outer portion. When secured to the gun the lug

- 15 818 is situated in the mouth 807 and the ball 815 is sprung loaded into a socket 835 axially arranged in front of the lug 818. The socket 835 is simply a hole drilled through a plate member and to release the bipod from the gun, the ball 815 is depressed from a forwards direction of the gun against the force of the spring 816.

- 20 To move the legs from a lowered position, where the gun is standing upon the legs (as viewed in Figures 4 and 5), to the raised position where the legs lie alongside the gun receiver (as shown in phantom lines in Figure 3 but without the gun being shown), the upper leg 801 is pulled away from the bracket 810 so that the
- 25 stop pin 822 is removed from the slot 813. The leg is then rotated around the arcuate surface of the bracket 810 until the bias of the spring 826 pushes the pin 822 into the slot 812.

To extend the inner leg 802 with respect to the outer leg 801 the button 832 is depressed and the collar 830 pulled away from the

- 30 bracket 810 until the desired extension is reached when the button is released to engage with one of the holes 828.

Referring now to Figure 4, the ability of the present bipod to permit a gun to roll in the Y plane is demonstrated, and the gun (shown in phantom lines) rolls about the ball 815 and lug 818. The

- 35 present invention also permits the gun to sweep in the X plane and this is shown in Figure 5 where the gun (shown in phantom lines) is shown at one particular angle of sweep, the maximum angle being determined by the width of the mouth 807.

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Attention is directed toward our co-pending Application Nos
which relate to various other features of the gun as herein described.

CLAIMS:

1. A bipod for a gun including a pair of legs (800) connected to a mounting means (803), characterised in that the mounting means comprises a forwardly facing part spherical ball (815) for connection within an aperture (834) in the underside of the gun and a rearwardly facing mouth (807) for cooperating with a lug (818), also on the underside of the gun, which is axially displaced from the aperture (834), the arrangement of the ball and mouth being such as to permit the gun to sweep and roll in X and Y planes respectively.
2. A bipod as claimed in Claim 1, characterised in that the part spherical ball (815) is spring (836) biassed forwardly towards the gun aperture to facilitate attachment/detachment from the gun.
3. A bipod as claimed in Claim 1 or 2, characterised in that the legs (800) are both pivotally connected to the mounting means (803) and arranged to adopt at least two predeterminedly fixed positions.
4. A bipod as claimed in any of Claims 1, 2 or 3, characterised in that each leg (800) is supported from an axle (821) secured to the mounting means (803) and disposed along the leg axis is a stop in (822) arranged to cooperate in turn with one of two perpendicularly displaced open-ended slots (812, 813) in the mounting means, the leg being spring (826) biassed toward said slots.
5. A bipod as claimed in Claim 4, characterised in that each leg (800) is spring biassed toward said slots (812, 813) by the arrangement of a hanger (823) circumferentially encircling the leg having one end mounted on the axle (821) and its other, remote, end connected to a pin (825) passing through an axial slot (827) in the leg, and a compression spring (826) between the pin (825) and a closure of the leg positioned toward the axle, whereby the spring is compressed to withdraw the stop pin from a respective one of the slots.
6. A bipod as claimed in any preceding claim, characterised in that the mounting means (803) comprise a yoke-shaped sub-frame (806) having two wings upwardly extending from the mouth (807) and a forwardly extending tube (808) within which is mounted the part spherical ball (815), and a U-shaped bracket (810) having limbs extending from the front of the tube (808) to a respective one of the wings.

7. A bipod as claimed in any preceding claim, characterised in that each of the legs (800) comprise at least two telescopically arranged tubes (801, 802) having a latch (831, 832, 833) therebetween for predeterminedly selecting a desired extension between the tubes.
- 5 8. A gun including a bipod having a pair of legs (800) connected to a mounting means (803) characterised in that the bipod comprises a forwardly facing part spherical ball (815) arranged to engage with an aperture (834) in the underside of the gun and a rearwardly facing mouth (807) arranged to cooperate with a lug (818) on the underside of the gun, 10 the lug (818) being axially displaced from the aperture (834), whereby the ball and mouth are arranged so as to permit the gun to sweep and roll in X and Y planes respectively.

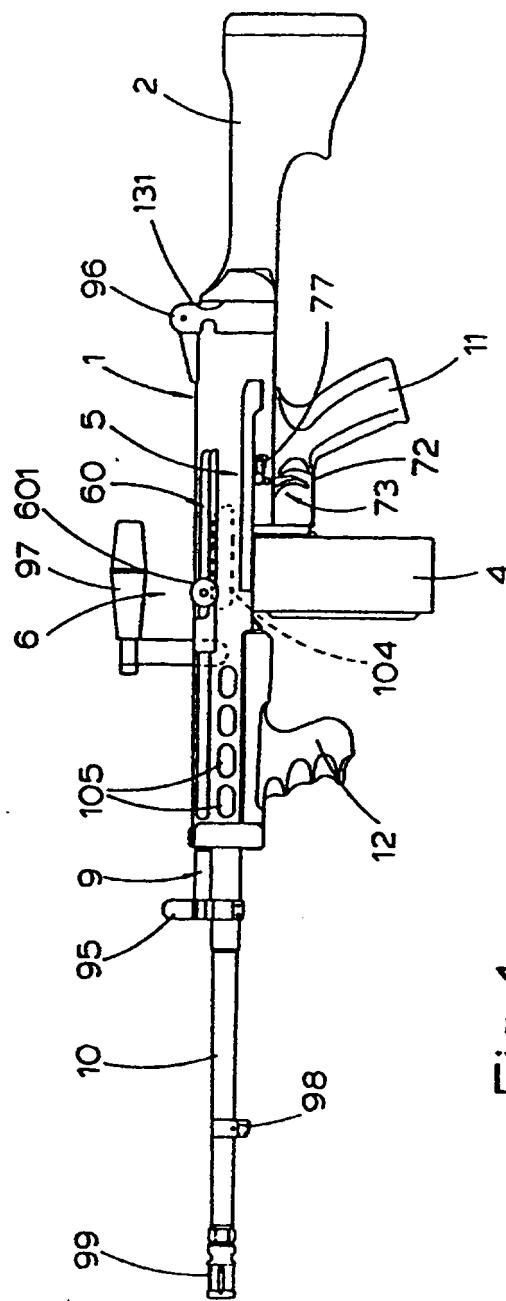


Fig. 1

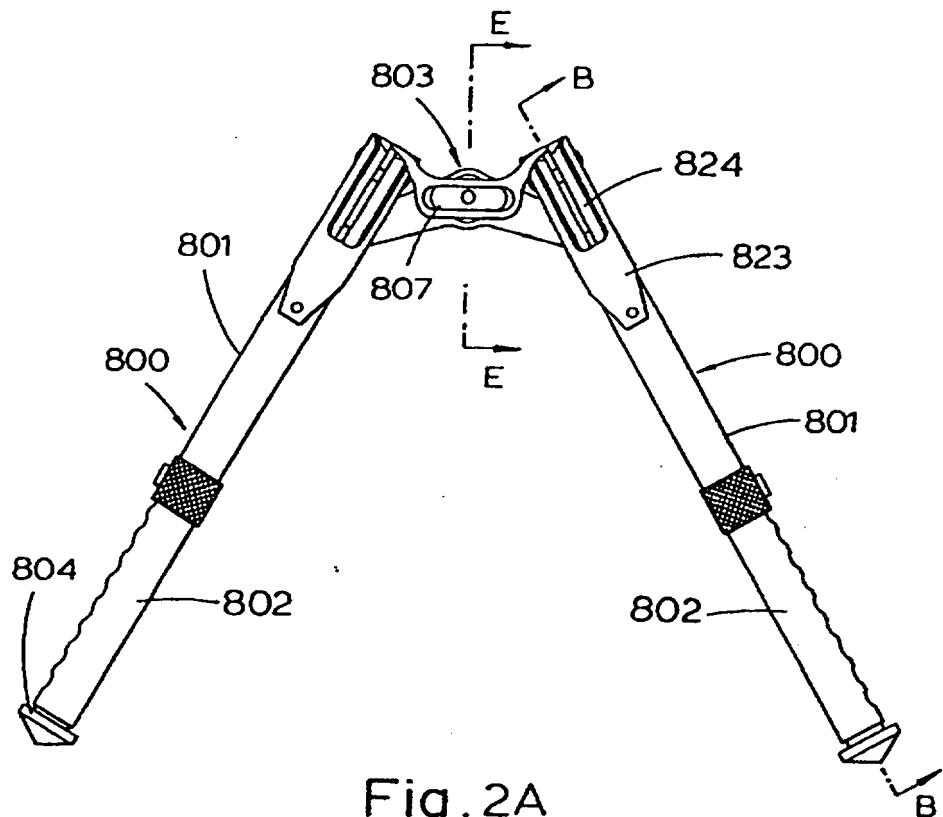


Fig. 2A

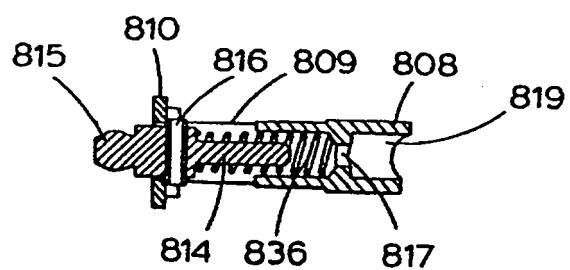


Fig. 2E

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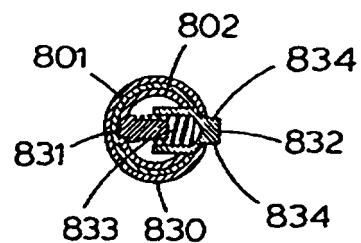
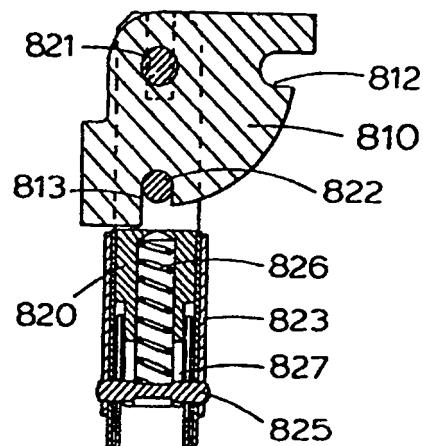


Fig. 2D

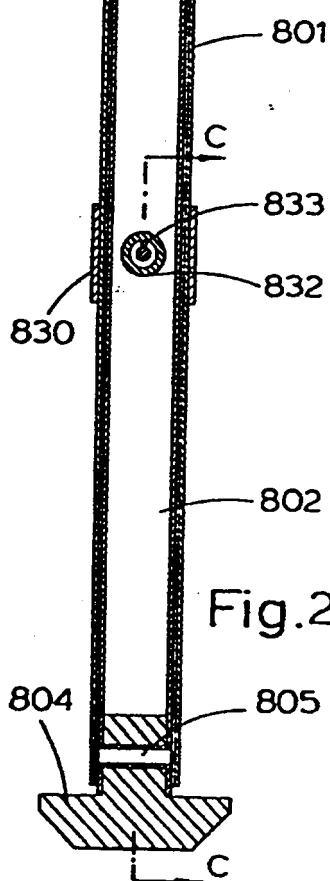


Fig.2B

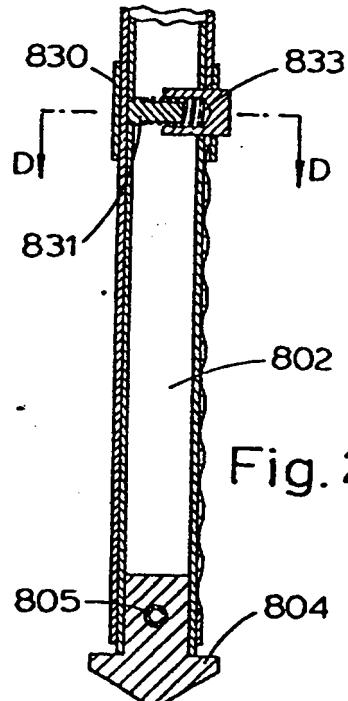


Fig. 2C

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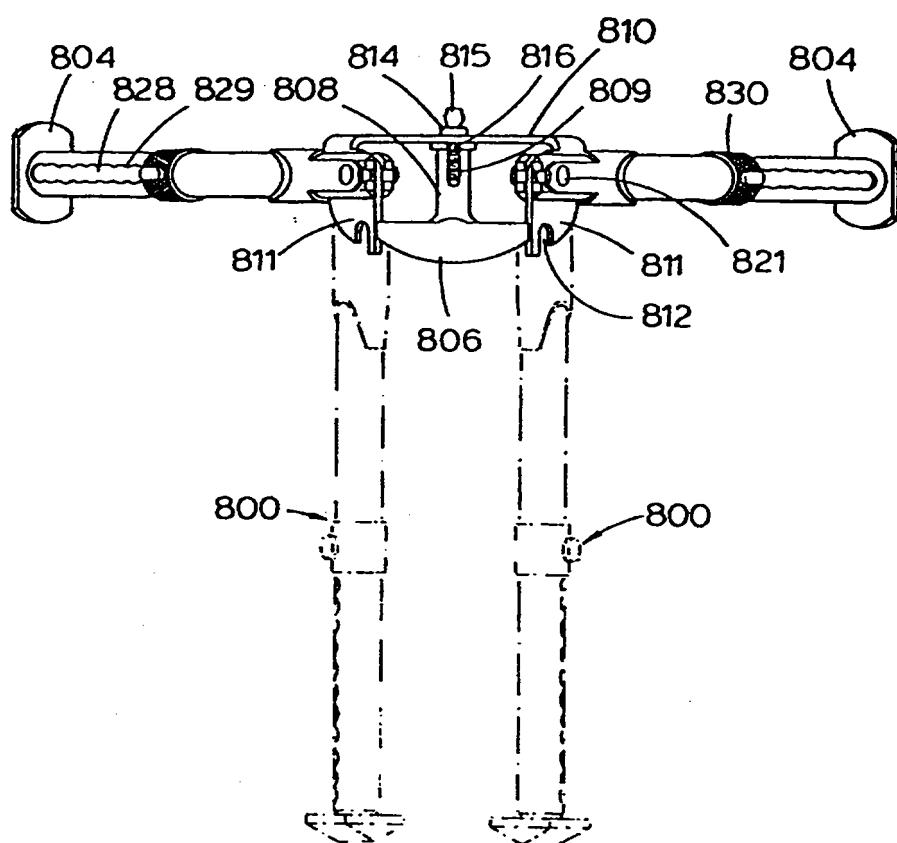
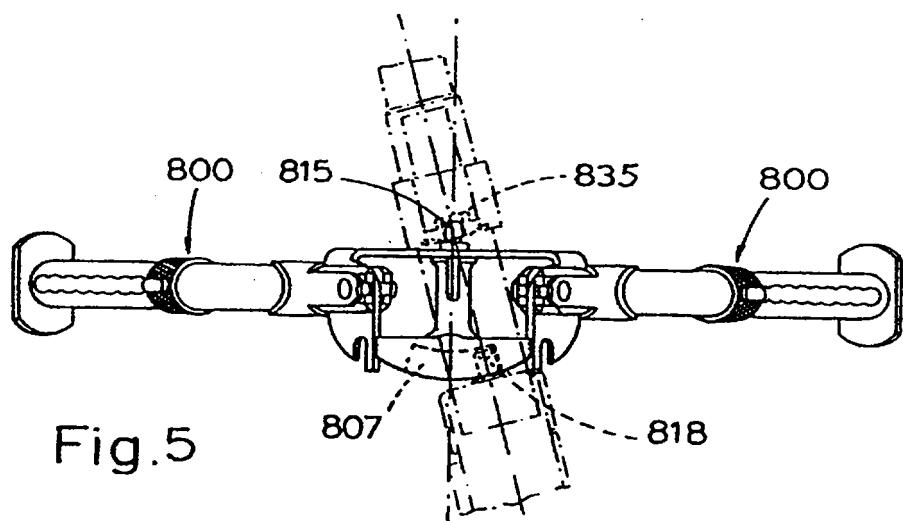
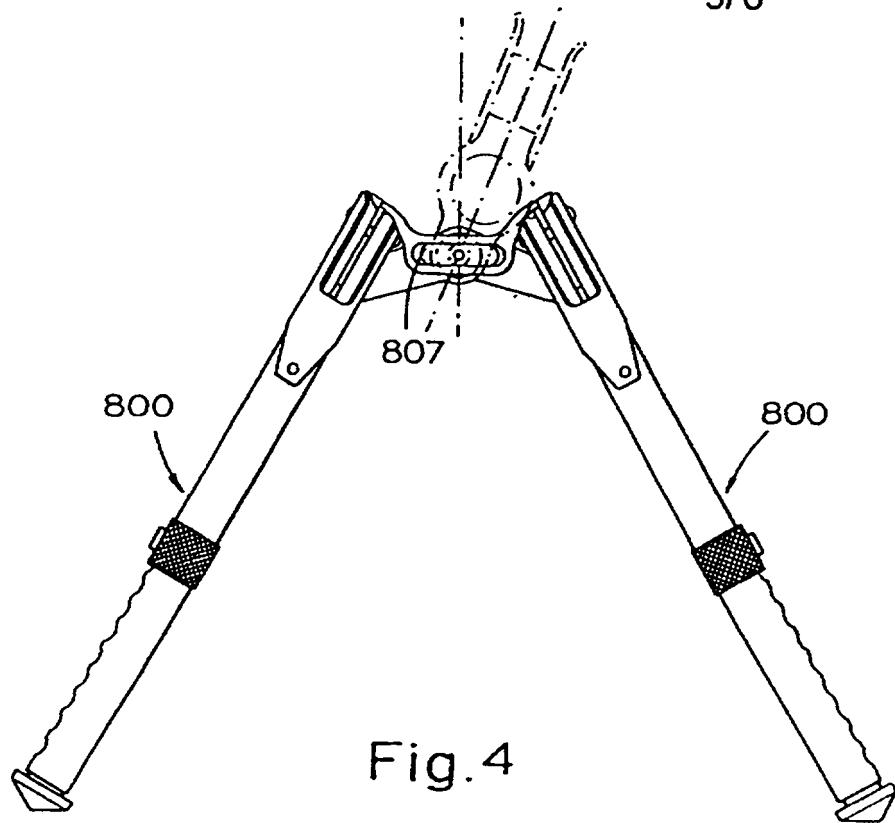


Fig. 3

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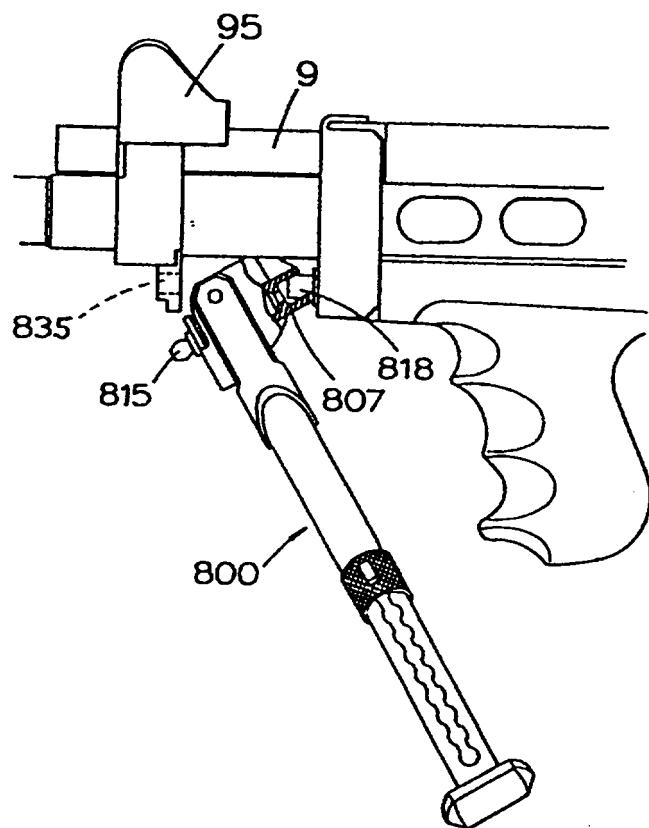


Fig. 6



DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. 2)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
A	DE-C- 197 104 (NELSON) * Figures; page 1, lines 17-53 *	1,8	F 41 C 29/00
A	US-A-1 618 966 (BULL) * Figures; page 1, lines 45-73 *	1,8	
A	GB-A-1 122 836 (RHEINMETALL) * Figures; page 2, lines 118-121; page 3, lines 2-4 *		
A	GB-A- 172 213 (WATTS et al.) * Figures 1,6 *		
A	FR-A-1 273 278 (PAILLER) * Figures 1-4; page 1, left-hand column, lines 8-11; page 1, right-hand column, lines 7-13 *		TECHNICAL FIELDS SEARCHED (Int. Cl. 2)
A	DE-A-1 578 405 (LÖFFLER)		F 41 C F 41 D F 41 G F 16 M
A	FR-E- 31 385 (DARNE)		
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 23-08-1984	Examiner FISCHER G.H.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			
T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			